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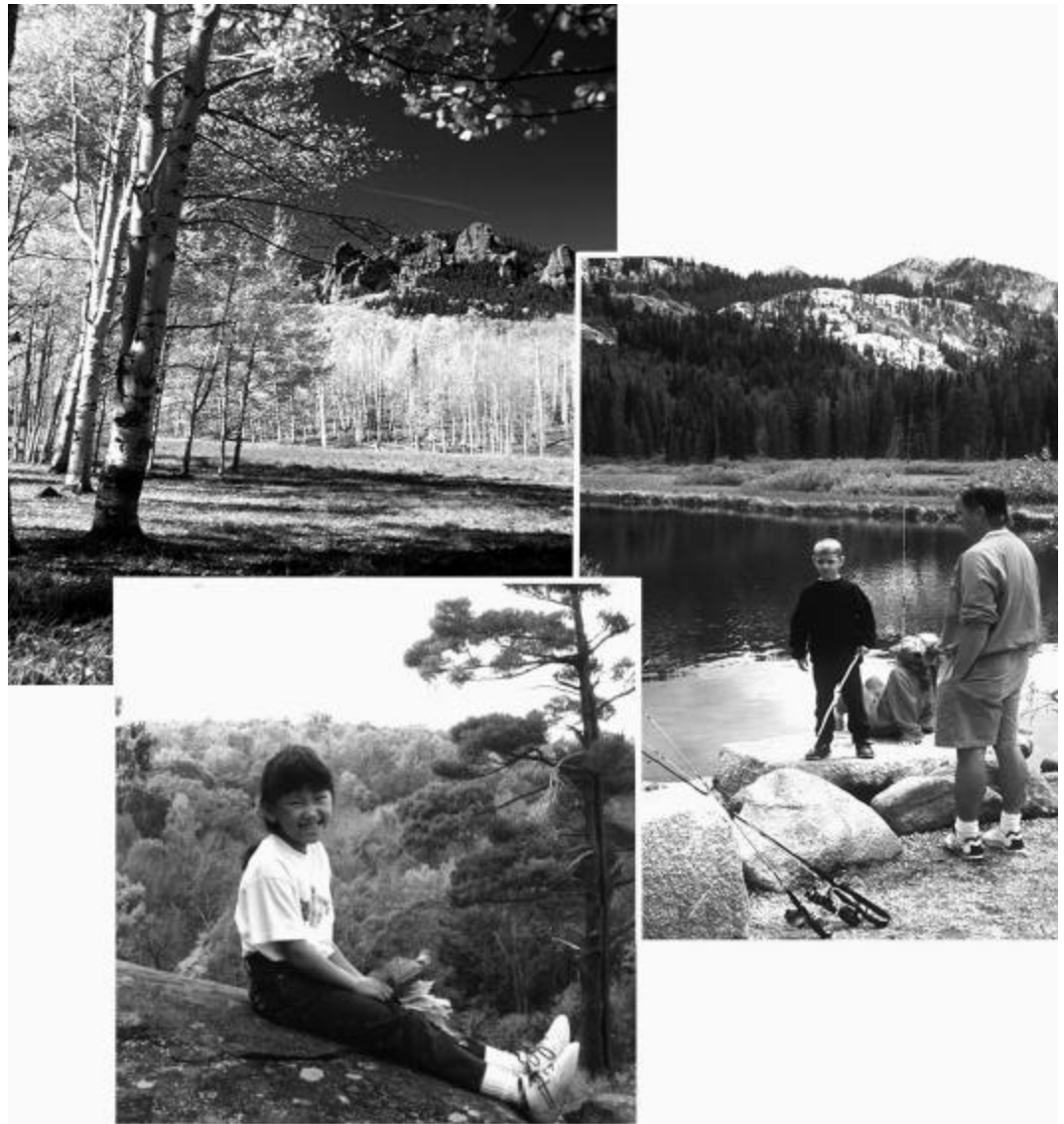
November 2000



Forest Service Roadless Area Conservation

Final Environmental Impact Statement

Forest Management Specialist Report



Forest Management Specialist Report

November, 2000

USDA Forest Service
Roadless Area Conservation

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Abstract:

This report provides detailed background and information analysis for the affected environment and environmental consequences of the alternatives analyzed in detail for the Forest Service Roadless Area Conservation Final Environmental Impact Statement (FEIS), November 2000. It covers the affected resource environment, assumptions, data and analytical methods used, and the analysis of effects for forest vegetation health and production that are summarized and disclosed in Chapter 3 of the FEIS.

Inventoried roadless areas comprise over 58 million acres, or roughly 31 percent of National Forest System (NFS) lands. Inventoried roadless areas have inherent characteristics and values that are becoming scarce in an increasingly developed landscape. While the NFS inventoried roadless areas represent about two percent of the total land base of the United States, they provide significant opportunities for dispersed recreation, sources of public drinking water, and large undisturbed landscapes that provide privacy and seclusion. In addition, these areas serve as bulwarks against the spread of invasive species and often provide important habitat for rare plant and animal species, support the diversity of native species, and provide opportunities for monitoring and research. For a more complete description of the background of the proposal, see Chapter 1, *Purpose of and Need for Action*, in the FEIS.

Annual timber offer volumes under the preferred alternative are estimated to drop nationwide by approximately 6% as a result of prohibitions of road construction, reconstruction and timber harvest for other than certain stewardship purposes within inventoried roadless areas. Within inventoried roadless areas, annual timber offer volumes under the preferred alternative are expected to drop by 85%. Cost per acre for approved stewardship-purpose timber harvest and other forest vegetation treatments within inventoried roadless areas will rise as a result of the prohibitions.

Changes Between Draft and Final EIS:

- The description of timber harvest methods and practices (including types of equipment, skid trails, etc.) allowed under each prohibition alternative has been expanded and clarified.
- The analysis of effects on timber harvest has been expanded from a discussion on volumes to include estimated acres treated (or not treated).
- Additional discussion has been added regarding allowable sale quantity (ASQ) and suitable acres for timber harvest.
- Additional discussion has been added regarding substitution of private land timber volume for public land supplies, as well as imports from other countries.
- Alternative 3 was modified to limit stewardship-purpose timber harvest.

Affected Environment

About one-third of the total U.S. land area is made up of forest land, which is land that is at least 10 percent stocked by forest trees of any size. These forests vary from sparse scrub forests of the arid, interior West to the highly productive forests of the Pacific Coast and the South, and from pure hardwood forests to multi-species mixtures to coniferous forests. Most of the forest land in the eastern U.S. is in private ownership, while most forest land in the west is public.

American forests have a wide variety of forest types and ages, including old-growth stands, naturally regenerated forests, and planted forests. Areas of old growth remain in the Pacific Northwest, parts of California, and much of the Rocky Mountains. East of the 100th meridian, most of the forests are second growth, naturally regenerated stands. In some cases, these lands were never fully converted to agricultural use, but selective logging was common. The tree species found in these stands are usually similar to those that would have existed there before European settlement. Even in most forest plantations, the species composition mimics the forest that would have naturally regenerated there (Sedjo 1991).

Timber Harvest

Of the 747 million acres of forest land in the United States in 1997, about 490 million acres are considered commercial (capable of growing 20 cubic feet or more of wood per acre per year). Approximately 70% of all commercial forest land is found in the Eastern United States; roughly 30% is found in the West. Private lands account for 71% of the total commercial forest land. National forests account for another 19% of the total commercial forest land; the remaining 10% are in other public or Tribal ownerships. On public lands, almost 7% of the total forest land base has been set aside from timber production. Some 78% of the reserved forest land area is in the West.

The volume of timber on all forest lands has been increasing since 1952 when inventory data first became available. Much of the hardwood timber volume is in the East, while much of the softwood volume is in the West. In the West, 46% of the softwood timber resource is on NFS lands (USDA Forest Service 1999b).

Within the 192 million-acre National Forest System, the Forest Service manages 140 million acres of forest land, 56% of total federal forest land. Because of the distribution of public lands, 78% of the commercial forest land on national forests is in the West.

In 1997, the volume of growing stock on all National Forest System (NFS) lands was approximately 1,260 billion (nearly 1.3 trillion) board feet (BBF). Net annual timber growth in 1996 on all NFS lands was about 20.5 BBF. Removal of timber volume from all NFS lands due to harvest, mortality, or land clearing for the same year totaled about 4.1 BBF, or approximately 20% of growth (USDA Forest Service 1999b). While the 1996 removal is not a current annual average, the difference between growth and removal is indicative of an ongoing substantial net increase in volume of wood fiber standing on NFS lands.

Trends in Consumption, Production, and Import of Wood Products – A significant effect of the reduction in Federal timber harvest between 1987 and 1997 (from about 13 BBF to 4 BBF annually) has been to transfer harvest to private forest ecosystems in the United States and to forest ecosystems in Canada (MacCleery 2000). For example:

- Since 1990, United States softwood lumber imports from Canada rose from 12 to 18 BBF, increasing from 27% to 36% of United States softwood lumber consumption. Much of the increase in Canadian lumber imports has come from the native old-growth boreal forests. In Quebec alone, the export of lumber to the United States has tripled since 1990. The increased harvesting of the boreal forests in Quebec has become a public issue there.
- Harvesting on private lands in the southern United States also increased after the reduction of Federal timber harvest in the West. Today, the harvest of softwood timber in the southeastern United States exceeds the rate of growth for the first time in at least 50 years. Increased harvesting of fiber by chip mills in the southeastern United States has become a public issue regionally.

Total national production of lumber, plywood, and all other timber products in the United States has been relatively stable over the past decade, averaging slightly more than 18 billion cubic feet annually from 1987 to 1999. However, total national consumption of timber products during the same period has averaged about 20 billion cubic feet annually. Softwood lumber production is the largest category within the totals above. National production has not been keeping pace with demand. Production averaged 35 BBF while consumption averaged 45 BBF annually.

Suitable Lands – Of the 93 million acres of commercial forestlands on NFS lands, an estimated 47 million acres (51%) are considered suitable for timber production. Lands that are suitable for timber production are those that are capable of reforestation within 5 years of harvest, able to be harvested without irretrievable damage to soils or watershed, and are not in an area reserved by Congress or otherwise determined to be unavailable for timber production. Responsible officials may establish timber production as a multiple-use land management plan objective for lands where costs of timber production are justified by the ecological, social, or economic benefits.

Through the land management planning process, each national forest and grassland determines the location and amount of suitable acres. Of the 47 million acres within the National Forest System designated suitable for timber production, there are an estimated 9 million acres (roughly 20%) located in inventoried roadless areas where existing land management plans would allow timber harvest and road construction to occur. Most of the acres of commercial forestland in inventoried roadless areas occur in the Western United States and Alaska. Table 1 shows the approximate amount of suitable acres of commercial forestland in inventoried roadless areas by region.

Table 1. Estimated acres (in thousands) of forestland suitable for timber production in inventoried roadless areas, by Forest Service region.

Region	Acres suitable for timber production (1000's)
Northern (1)	2,274
Rocky Mountain (2)	1,317
Southwestern (3)	63
Intermountain (4)	1,598
Pacific Southwest (5)	394
Pacific Northwest (6)	1,701
Southern (8)	332
Eastern (9)	85
Alaska (10)	1,274
Total	9,038

(USDA Forest Service 1994)

Allowable Sale Quantity (ASQ) – ASQ is the quantity of timber that may be sold from a national forest as determined by the forest land management plan during the period specified by the plan. It is usually expressed as an average annual volume which may be sold from the forest's suitable (for timber production) land base. Timber may be sold from lands that are not identified as suitable for timber production in the land management plan if necessary to achieve desired vegetation conditions; however, this volume is generally not included within the ASQ.

As land management plans have been revised, a trend of substantial decreases in ASQ has been appearing. Table 2 summarizes this information for forests that have revised land management plans or have published draft plan revisions through 1999. In the Pacific Northwest Region, forests are operating under probable sale quantities until their next land management plan revisions calculate new timber harvest limitations under the provisions of the new forest planning regulations (November 2000). As land suitable for timber production and timber harvest limitation volumes continue to decrease, it is likely that timber harvest volume from non-suitable lands will increase to meet fuel reduction and other non-timber vegetation management objectives of land management plans.

This downward trend in ASQ volume is assumed to be continuing throughout all NFS lands, not just in inventoried roadless areas. This is partly due to changing management emphasis in inventoried roadless areas. The change in emphasis can be traced to the emergence of ecosystem management in the early 1990s, development of the Northwest Forest Plan and other similar regional plans, and the Forest Service Natural Resource Agenda. ASQ volume applies only to that volume scheduled to be removed from land suitable for timber production. Additional unscheduled timber volume has been and will continue to be harvested to restore, improve, or maintain ecosystem health.

Table 2. Changes in allowable sale quantity (ASQ) in recent land management plan revisions.

Region	Forest	Year plan revised	Previous ASQ (MMBF ^a)	New ASQ (MMBF ^a)	Reductions (%)
Rocky Mountain (2)	Arapaho-Roosevelt	1997	30	7	-77
	Black Hills	1997	152	87	-43
	Rio Grande	1996	36	23	-36
	Routt	1998	38	38	0
Intermountain (4)	Targhee	1997	86	8	-91
Pacific Northwest (6)	Deschutes	1994	99	63	-36
	Gifford Pinchot	1994	334	65	-81
	Mt. Baker Snoqualmie	1994	108	7	-94
	Mt. Hood	1994	189	65	-66
	Okanogan	1994	63	45	-29
	Olympic	1994	111	10	-91
	Rogue River	1994	120	26	-78
	Siskiyou	1994	160	24	-85
	Siuslaw	1994	335	12	-96
	Umpqua	1994	334	78	-77
	Wenatchee	1994	136	20	-85
	Willamette	1994	491	116	-76
	Winema	1994	45	37	-18
	Francis Marion	1996	59	17	-71
	George Washington	1993	38	33	-13
	NFs in Texas	1996	112	113	1
	NFs in Florida	1999	107	86	-20
Southern (8)	Kisatchie	1997 (Draft)	128	51	-60
	Tongass	1999	450	187	-58
Alaska (10)	Tongass	1999	450	187	-58

^a Million board feet

(Forest Service Ecosystem Management Coordination Staff 2000)

Estimates of expected timber offer and harvest quantities over the short- and long-term are provided in the Environmental Consequences section as effects described under each alternative. In November, 2000, new regulations revising National Forest System land and resource management planning procedures became effective. Allowable Sale Quantity will no longer reported as such. The new rule requires national forests to estimate the limitation of timber harvest, or the amount of timber that can be sold annually in perpetuity on a sustained yield basis, during the forest planning process. The limitation of timber harvest, which will replace ASQ for existing land management plans, will be recalculated at the time of the next plan revision.

National Forest Timber Harvest – Timber harvest is the process by which trees with commercial value are cut and removed from the forest. Timber sale refers to a contractual process of selling the timber to a purchaser and implementing a series of harvesting requirements for what type, how and when the trees are removed. For purposes of this analysis, these terms are used interchangeably.

Timber sales are often used as a least-cost method (revenue is returned to the Federal treasury to offset the costs of preparing and carrying out the timber harvest) of managing vegetation to meet resource objectives or to achieve desired ecosystem conditions. These objectives or desired conditions include improving wildlife habitats, reducing fuels that may increase fire risk, recovering timber value from natural disasters, such as windstorm or fire, reducing impact of insect and disease, and improving tree growth in addition to producing timber from the national forests.

Roads are required to support a timber sale, and frequently they must be constructed or reconstructed to meet timber harvest or other resource management objectives. Roads are needed to move equipment into the area and to haul logs or other forest products to the community where they will be processed. While timber can be harvested using helicopters or cable yarding systems from existing roads, the use of these methods depends on the value of the timber being removed, the terrain, and the distance to an existing road. Each timber sale contract specifies the yarding method and any permanent or temporary road construction and reconstruction required.

Timber purchasers may be required to complete needed road reconstruction to ensure public safety and to mitigate the damage to the environment from logging traffic. When the Forest Service determines that roads are needed for other multiple-use activities, the roads are constructed to meet appropriate road specifications and retained for future use after the timber sale. By law (16 USC 1608 (b)), temporary roads are used only for the duration of the timber sale and then closed, decommissioned or converted to a classified road. Even helicopter sales may require some classified road construction, reconstruction, or temporary road construction to access landings for hauling logs.

Road spacing and distance from the nearest road have a direct effect on yarding costs of wood fiber. As the road spacing or distance from the nearest road increases, so does the average yarding distance for a given harvest unit. This affects turn speeds and production rates which affect yarding costs. Frequently, the edge of a harvest unit furthest from the road reflects the maximum external yarding distance. External yarding distance dictates the size class of the yarding equipment needed to retrieve the material. This in turn determines the road width needed for that size equipment. Generally, wider road spacing means longer yarding distances, which requires larger yarders and wider road widths. The location of a road is particularly important in an area planned for cable logging. Roads located at the break (where the side slope changes from gentle to steep) provide better cable deflection, which results in larger payloads and less ground disturbance. (USDA Forest Service 1999c, 1978, 1974).

The trend in silvicultural practices is shifting away from even-aged management toward management of uneven-aged stands primarily due to public controversy and management

concerns about non-timber resources. These multi-story and multi-age stands require thinning and other silvicultural treatments with greater frequency, thus needing road access more often. Thinning to remove excessive forest fuels, before using prescribed fire, or to treat diseased or insect infested stands is often economically feasible only if a road system is present (USDA Forest Service 1999c). Nationally, clearcutting has decreased from 31% to total harvested acres in 1989 to 10% in 1997 (USDA Forest Service 1998b). This downward trend is expected to continue.

Timber Sale Purpose – Timber sales are used to achieve a variety of vegetation management objectives. Under the Timber Sale Program Information Reporting System (TSPIRS), timber is sold for one of three purposes: 1) forest stewardship, 2) timber commodity, or 3) personal use. The main objective of stewardship-purpose timber sales is restoring, improving, or maintaining ecosystem health. The main objective of commodity-purpose timber sales is to provide a sustainable yield of forest products to meet the nation's demands. Personal use sales are made primarily to supply firewood, Christmas trees, and other miscellaneous forest products to individuals for their own consumption. Most timber sales (90% or more of the national volume sold) are for either stewardship or commodity purposes, or they may include volume for both purposes within the same sale.

During fiscal year 1997, 52% of national forest timber harvested was for commodity purposes, down from 71% during 1993. Timber harvested for stewardship purposes in 1997 was 40%, compared to 24% during 1993, and this increase is expected to continue. Timber harvest for personal use purposes remained stable in the 5% to 8% range over the same period (USDA Forest Service 1998b).

National Forest Timber Trends – The volume of timber sold from NFS lands declined from more than 11 BBF in 1987 to 2.2 BBF in 1999. The average annual volume sold from 1993 to 1999 was 3.2 BBF. The volume of timber sold from all federal lands covered by the Northwest Forest Plan declined from a yearly average of about 5 BBF in the 1980's to a low of 297 million board feet (MMBF) in 1994 following the injunctions barring federal timber sales in northern spotted owl habitat. The volume of timber harvested from federal lands in the interior Columbia River basin declined from a peak of 3.3 BBF in fiscal year 1987 to about 900 MMBF in fiscal year 1997 (U.S. Government Accounting Office 1999). Nationally, this reduction was offset by an increase in Canadian and other foreign imports and harvesting on private lands.

Figure 1 displays the volume of timber sold from national forests from 1905 to 1999.

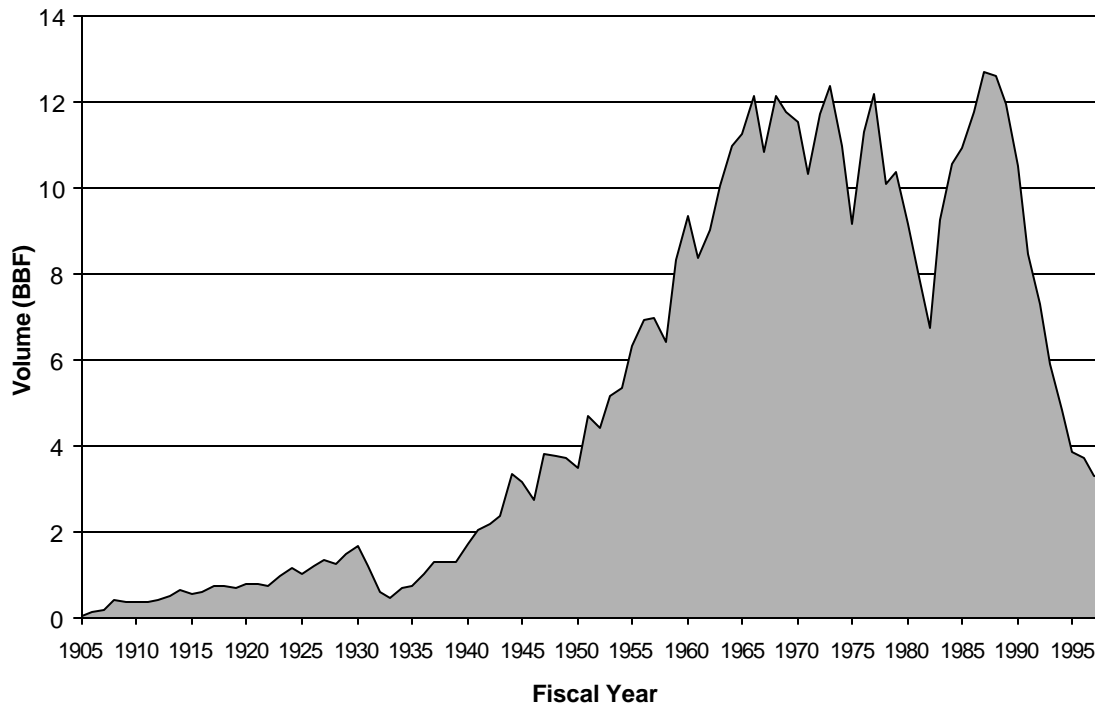


Figure 1. Long-term trend in volume of timber harvested from the national forests.

Table 3 shows the recent national trends in area harvested and volume offered as part of the NFS timber sale program. Timber offered is the volume of timber advertised for sale. Volume sold is the amount of timber actually purchased, which is usually less than offered volume because some sales are judged as economically marginal by prospective purchasers, and they receive no bids. Volume harvested is the actual volume removed from the forest in a given year, which may be higher or lower than volume sold depending on market conditions. Most harvest volume was actually sold 1 to 3 years earlier. Refer to the Timber Harvest and Forest-dependent Communities portions of the Social and Economic Factors section of the FEIS and the Socio-Economic Specialist Report for a more detailed discussion regarding market influences, employment, Payments to States, and dependent communities.

Table 3. National trends in National Forest System timber sale program.

Fiscal year	Timber offered (MMBF ^a)	Volume sold (MMBF ^a)	Volume harvested (MMBF)	Acres harvested (thousands)
FY 1997	3,999	3,688	3,285	458
FY 1998	3,388	2,955	3,284	526
FY 1999	2,300	2,200	2,939	449
FY 2000	1,800	1,700	2,522	385

^a Million board feet
(USDA Forest Service 1998b, WO Forest Management Staff estimates)

Inventoried Roadless Areas - There are currently 58.5 million acres of inventoried roadless area within the National Forest System. About 24.2 million acres are allocated within forest plans to prescriptions that do not currently allow road construction or reconstruction (but some may allow timber harvest under certain conditions, such as for fire salvage or suppression of insect infestation). The remaining 34.3 million acres are currently allocated to forest plan prescriptions that allow road construction and reconstruction.

According to regional estimates, about 2.6 million (8%) of the 34.3 million acres have roads. Some of those roads existed prior to the 1979 RARE II inventory and were included within the inventoried roadless areas; other roads were constructed later for general forest management purposes following release from consideration for wilderness designation by Congress. In half of the regions, the acreage of these roaded portions ranged from 3-11% of the total inventoried roadless areas. Region 8 (Southern) has 18% (about 81,000 acres) and Region 9 (Eastern) has 47% (about 228,000 acres) of roaded area within inventoried roadless areas. Region 4 (Intermountain) has the largest area containing roads—1.2 million acres, followed by Region 1 (Northern) with 612,000 acres and Region 2 with 356,000 acres.

Of the 34.3 million acres currently allocated to forest plan prescriptions that allow road construction and reconstruction, about 9 million acres are suitable for timber harvest. Approximately one million of those acres have since been entered for timber harvest (USDA Forest Service, 1994b).

Roadless Areas Timber Harvest Trends – From 1993 to 1999, national forests sold 783 MMBF from approximately 80,000 acres (an average of 112 MMBF and about 11,000 acres per year) from inventoried roadless areas. This is less than 4% of the average annual volume sold from all national forests during the same period. About one-third of that volume was salvage from trees killed primarily by fire, insects, and disease.

Nearly one-third of that volume (275 MMBF) was sold on the Tongass National Forest in Alaska. After subtracting the Tongass volume, national forests in the lower 48 states sold an average of 73 MMBF per year over fiscal years 1993-1999. Of the total volume sold, about 293 MMBF was salvage, an average of 42 MMBF per year (USDA Forest Service, 1993-99 TSPIRS, Cut and Sold Annual Reports). During FY 98 and FY 99, the proportion of total roadless area volume sold to total national volume sold dropped to 3% and 2%, respectively. The Interim Rule Suspending Road Construction in Unroaded Areas of National Forest System Land was implemented in March of 1999, which may explain some or all of the reduction in FY 98-99.

Timber volumes planned from inventoried roadless areas on all national forests during fiscal years 2000 through 2004 were evaluated. Table 6 summarizes current planned volume, acres to be harvested, and miles of road construction planned. The preferred alternative would not apply to fiscal year 2000 sales already sold, and may not apply to much of the volume in fiscal years 2001 and 2002 where projects are more likely to have approved environmental decisions before final rule implementation date. However, the data represent a reasonable estimate for the first 5 years under full implementation of the preferred alternative.

Forest Health - Insects and Disease

Many forestlands across the country are at risk of serious insect attack and disease infection. In the inland Western United States, trees across wide areas of the landscape are dying faster than they are growing or being replaced (Mutch and others 1993). Because of this, tree mortality conditions exist that almost guarantee large and severe wildland fires. Other forest resources, aquatic, wildlife, watershed and other values, are also affected. Managers of public and private forests are being challenged to take rapid preventative action to restore these forests to conditions more similar to their historic range of variability or at least to a socially desired condition (Edmonds and others 2000).

Examples of recent insect and disease concerns include:

- Over the past 10 years, spruce beetle has affected 2-3 million acres of forested land in Alaska. In many areas, 80-90% of the susceptible spruce has been killed, leaving few or no trees to support further beetle activity. Spruce beetle activity has declined in the past several years in Alaska, from a peak of 1.1 million acres in 1996 to 253,000 affected acres in 1999, probably due to a lack of suitable host material within susceptible stands of mature, even-aged, slow-growing spruce (Campbell and others 2000).
- The 1991 inventory of suitable timber lands on the Payette National Forest in Idaho showed recent mortality levels four times that of the late 1970's. Nearly half of that forest's suitable timberland had mortality exceeding growth, with substantial spruce beetle infestation related primarily to the overstocked condition of forest stands (Blatner and others 1994, O'Laughlin and others 1993).
- Boise National Forest staff estimated that average annual mortality volume exceeded annual growth during 1988-1992. More than 400,000 trees died from bark beetle attacks during 1988-1991. The Douglas-fir tussock moth defoliated more than 240,000 acres during 1990 and 1991, which weakened trees and made them more susceptible to the Douglas-fir beetle. The predominance of older stands of Douglas-fir on the Boise continued to make Douglas-fir beetles a major concern (Blatner and others 1994, O'Laughlin 1994).
- During 1992-1993, several southern pine beetle infestations on National Forests in Texas wilderness areas killed more than 12,600 acres of pine forest, which represented 38% of the pine host type within those areas (Billings 1994). Numerous private and industrial landowners suffered resource losses as the beetles spread directly across wilderness boundaries onto private land. Beetle infestations on non-wilderness federal lands during the same period were targeted for direct control. Less than 2% of the available pine host type was lost in these managed forests (Billings 1995).

Risk Mapping. In 1996, the Forest Service initiated a mapping effort to evaluate forest health risk on all forested lands in the United States. A geographic information system database was created that displays NFS lands most at risk of mortality from insects and diseases. This database is still under development. In its current form, it is recommended for use only at the national scale. It will be used in combination with other layers (fire, threatened and endangered species, and wildland-urban interface), still under development, to help set priorities for addressing forest health problems (Lewis 2000).

Information from the insect and disease geographic information system layer has been used at a broad national scale to identify acres at risk from substantial tree mortality and growth loss from insects and disease. The endemic insect and disease rate is approximately 5% mortality. Areas are at risk if 25% or more tree mortality or growth loss (beyond the endemic level) can be expected over the next 15 years. Gypsy moth, root diseases in the West, mountain pine beetle, and southern pine beetle accounted for more than two-thirds of the acres at risk of tree mortality. Dwarf mistletoes and heart rot accounted for nearly three-fourths of the acres at risk of growth loss (Lewis 2000).

Nationally, approximately 58 million acres of all ownerships are at risk of tree mortality, and 24 million of those acres are NFS lands. About 3 million of these acres on national forests occur inside inventoried roadless areas where road construction is not currently allowed by land management plans. In inventoried roadless areas, another 4 million acres at risk are in areas where road construction and reconstruction are currently permitted by the land management plans. The percent of area at risk in inventoried roadless areas is about the same as the percent of area at risk for all NFS lands.

The majority of the areas at risk from root disease are in large, highly concentrated areas in western Montana and northern Idaho. Mountain pine beetle high-risk areas are found throughout the West but are concentrated in Washington, Oregon, and Montana. Growth-loss risk projections identified approximately 48 million acres across the country. Dwarf mistletoe infestations across the West accounted for slightly more than a third of those acres, and heart rot in Alaska made up slightly more than a third (Lewis 2000).

Geographic information system data for insect and disease risk of mortality is identified, at a coarse national scale only, in Table 4 below, by Forest Service Region, for National Forest System lands.

Table 4. Acres, in thousands, of inventoried roadless areas at risk of insect and disease mortality.

Region ^a	Inventoried roadless areas	Inventoried roadless areas at risk of insect and disease mortality
Northern (1)	9,005	3,944
Rocky Mountain (2)	6,183	350
Southwestern (3)	2,771	44
Intermountain (4)	15,960	1,341
Pacific Southwest (5)	4,200	169
Pacific Northwest (6)	4,002	233
Southern (8)	954	119
Eastern (9)	664	131
Alaska (10)	14,779	131
Total	58,518	6,462

^a(Roadless Database 2000)

Geographic information system data for insect and disease risk of mortality was combined with fire risk data to identify, at a coarse national scale only, joint areas of concern. Table 5 below identifies this combined risk by Forest Service region.

Table 5. Acres, in thousands, of inventoried roadless areas at combined risk of insect, disease, and fire.

Region ^a	Inventoried roadless areas	Inventoried roadless areas at combined risk of insect, disease, and fire
Northern (1)	9,005	246
Rocky Mountain (2)	6,183	43
Southwestern (3)	2,771	35
Intermountain (4)	15,960	221
Pacific Southwest (5)	4,200	93
Pacific Northwest (6)	4,002	102
Southern (8)	954	106
Eastern (9)	664	24
Total	43,739	870

^a Region 10 (Alaska) is not included. Data unavailable.
(Roadless Database 2000)

While these combined at-risk acres have a critical need for forest health treatments, such as thinning and fuels reduction, it should be noted that the percentage of these acres in inventoried roadless areas is slightly lower than that of the combined at-risk acres for all NFS lands.

Tongass National Forest

The Affected Environment sections in the Final EIS and the Tongass Biological Resources and Social/Economic Specialist Reports provide additional information about timber resources and forest health on the Tongass National Forest in Southeast Alaska.

Scoping Comments, Public Concerns and Issues

Public comments about commodity land uses such as timber harvest generally were frequently ones of opposing viewpoints. Some respondents believe timber harvest should be allowed in roadless areas; others believe it should be prohibited.

Many respondents wrote that prohibiting road construction and reconstruction within inventoried roadless areas will hinder efforts to regulate forest health. They argue that the Forest Service should manage these lands to control fire and disease. They believe that the prohibitions will increase management costs and result in areas of over-grown, unhealthy forests. Others believe that active management that emphasizes logging is unnecessary in inventoried roadless areas, and that evidence suggests that many of our forest health problems stem from logging, road construction, grazing and fire exclusion. (CAET, 2000)

Many comments focused on insect and disease control within inventoried roadless areas. In general, commenters suggested that the Forest Service should address the need for insect and disease management in these areas, but differed in their beliefs about whether timber removal should be used as a tool to accomplish insect and disease management.

Old Growth. A subset of public comments regarding the proposed prohibition of road construction and reconstruction within the inventoried roadless areas focused on old-growth forests. Some respondents called for protection of old-growth forests through prohibition of road construction and timber harvest within inventoried roadless areas. Others were concerned over the risk of insect infestation, disease and wildfire in these forests.

Special Forest Products. Special forest products include house logs, posts, poles, Christmas trees, mushrooms, beargrass, pinyon nuts, berries and ferns. There is a continuing public demand for these products for cottage industries and traditional and personal use

Analysis Methods

This analysis covers the effects, at a national scale, of the Prohibition Alternatives and the Tongass National Forest Alternatives on forest vegetation health and timber production.

Information Used

General information in the Affected Environment section about volume of growing stock, net annual timber growth and volume removals comes from the Draft 1997 RPA (Forest and Rangeland Renewable Resources Planning Act) Assessment United States Forest Resource Current Situation.

Historical volumes offered, sold and harvested for each national forest were collected for FY 93-99 using existing reports to establish a baseline for the analysis. Data was retrieved as far back as FY 93 to be able to display and analyze data prior to the Salvage Rider. The data source is the 1993-98 Timber Sale Program Annual Reports (TSPIRS), in various appendices, but usually titled "Employment, Income, and Program Level Account by Region and Forest." For FY 99, offer volumes came from the national Periodic Timber Sale Accomplishment Report (PTSAR) reports; sold and harvested volumes were taken from the national Timber Cut and Sold reports. The FY 2000 estimate for timber volume to be offered, sold and harvested comes from WO Forest Management Staff estimates.

Volumes sold within inventoried roadless areas (FY 93-99) were provided by the national forests in two categories: areas where forest plans do allow road construction and reconstruction, and areas where they don't. The Data Team assembled this data into spreadsheets by forest, region and national totals; these data are posted on the Roadless Area Conservation website (roadless.fs.fed.us).

Planned offer volumes within inventoried roadless areas for FY 00-04 were provided by the national forests. The initial data request asked for all volume planned within inventoried roadless areas as well as volume that required road construction or reconstruction. A second data request in June, 2000, produced volume splits for the roaded and unroaded portions of these areas, with a further breakdown of the unroaded portion volumes by logging system type and timber sale purpose (commodity or stewardship). Planned volumes for all national forest inventoried roadless areas for FY 00-04 can be found on the Roadless Area Conservation Project website. The planned total national offer volume estimates were reached in consultation with the Washington Office Forest and Rangeland Staff.

National forest acreage suitable for timber production and ASQ volumes were obtained from WO Forest Management staff files and updated with new forest plan revision volumes. Specific suitable acres, ASQ volumes, and long-term sustained yield calculations were not available for inventoried roadless areas on all forests. National data estimates of current total suitable acres and ASQ for inventoried roadless areas is dated (1993-94), but is the best available information.

Tongass NF volume impact estimates for the Tongass Selected Areas Alternative (prohibiting road construction and reconstruction only in four land use designations) were provided by Region 10 Forest Management staff.

Assumptions

- Decreased reliance on national forests for wood production will continue into the future as a result of changing public values for public lands.
- Technological advances will not allow a significant increase in timber harvest from inventoried roadless areas without the need for road construction and reconstruction.
- Forest health, insect and disease problems will continue at endemic levels, with periodic epidemic increases, and will continue to expand within inventoried roadless areas.
- Forest data on projected vegetation management provided to the EIS Team is reasonable and reliable information.
- Imports of wood products can continue to offset domestic shortfalls.

Methodology

Forest health effects analysis relied on forest insect and disease risk mapping data compiled and assessed by the Washington Office Forest Health Protection Staff (Lewis 2000). A coarse, national assessment of the effects of the intersection of fire, disease and insect high-risk areas within inventoried roadless areas on the national forests was done using GIS overlay results provided by the Roadless Data Team. An assumption was made that most future timber harvest done within inventoried roadless areas would accomplish some measure of forest health improvement, such as fuels reduction or treatment of insect or disease outbreaks, because of the high level of public controversy associated with timber harvest in these areas. The extent to which volume would be removed for commodity purposes only (see the discussion on timber sale purpose in the Affected Environment section), and acres treated which were derived from that volume, would be the extent to which the benefits of timber harvest for forest health improvement is overestimated in this analysis.

Effects on national forest timber harvest were compiled and evaluated using volume data provided by the national forests for (1) volume sold within inventoried roadless areas during FY 93-99 and (2) volume planned within inventoried roadless areas over the short term (FY 00-04).

Long-term timber volume estimates for inventoried roadless areas were projected using historic volume sold in those areas during FY 93-97 as a basis. A range of volume estimates was derived from this data under the assumption that future entries into inventoried roadless areas would be similar to those that occurred between 1993 and 1997, the most recent five-year period before the interim roads rule was implemented (see Appendix A). This may under-estimate the effects of the action alternatives on forests dependent on roadless area volume to meet current forest plan ASQ. It may over-estimate volume that would be harvested in the future considering the level of public controversy and the outcome of appeals and litigation over timber harvest in roadless areas. Another assumption made in this analysis was that if a forest had sold no volume within inventoried roadless areas over FY 93-99, and had projected no planned offer over

FY 00-04, it was unlikely that the forest would sell any significant amount of volume over the long term from these areas.

Stewardship-purpose timber volume for Alternative 3 was estimated by applying TSPIRS regional stewardship volume percentages to forest-level planned offer volumes. Where forests indicated a higher stewardship percentage in the response to the June, 2000, data call, the higher number was used to calculate stewardship volume. No further volume adjustments were made when the definition of stewardship was modified (see the discussion within Alternative 3 later in this report) in October, 2000.

Estimates of acres of future timber harvest within inventoried roadless areas were made by converting volume estimates to harvest acres using regional volume and acres harvested data.

Alternatives Considered

These four Prohibition Alternatives deal with activities that would not be allowed to occur, except in the No Action alternative, in the inventoried roadless areas. A brief description of the alternatives considered follows. Refer to the Chapter 2 of the Final Environmental Impact Statement for more information.

- Alternative 1: No Action; No Prohibitions. No rule prohibiting activities in inventoried roadless areas would be issued. Road construction and reconstruction would continue to be prohibited only where current land management plan prescriptions prohibit such action. Future proposals for road construction and reconstruction would be considered on a case-by-case basis at the project level where allowed by current land management plans.
- Alternative 2: Prohibit Road Construction and Reconstruction Within Inventoried Roadless Areas. This includes temporary road construction. All timber harvest as provided for under current land management plans would be allowed.
- Alternative 3: Prohibit Road Construction, Reconstruction, and Timber Harvest Except For Stewardship Purposes within Inventoried Roadless Areas. This includes temporary road construction. Only timber harvest that meets the intent of specific stewardship purpose as described under Alternative 3 later in this report would be permitted within inventoried roadless areas.
- Alternative 4: Prohibit Road Construction, Reconstruction, and All Timber Harvest within Inventoried Roadless Areas. All timber harvest and cutting of trees for any purpose, except for personal use firewood and Christmas trees, would be prohibited.

These four Tongass National Forest Alternatives were evaluated:

- Tongass Not Exempt. The prohibition alternative selected for the rest of the

National Forest System lands would apply to the Tongass National Forest. The final rule may include a social and economic mitigation measure which would delay implementation on the Tongass until 2004.

- Tongass Exempt. The prohibition alternative selected for the rest of the National Forest System lands would not apply to the Tongass National Forest.
- Tongass Deferred. No prohibition alternative would be applied on the Tongass National Forest at this time. The Responsible Official would determine whether the prohibition on road construction and reconstruction should apply to any or all of the inventoried roadless areas on the Tongass as part of the 5-year Forest Plan review beginning in 2004.
- Tongass Selected Areas. Road construction and reconstruction would be prohibited within four land use designations on the Tongass: Old Growth, Semi-Remote Recreation, Remote Recreation, and LUD II.

There are several exceptions in all of the action alternatives where the responsible official may authorize road construction or reconstruction in an inventoried roadless area. There are also several social and economic mitigation measures which the responsible official could apply to any of the action alternatives, resulting in the authorization of road construction or reconstruction. More information on these exceptions can be found in Chapter 2 of the FEIS.

Environmental Consequences

This analysis examines the consequences of implementing the various alternatives identified for roadless area conservation within the National Forest System upon the health and production of forest vegetation. Under all alternatives, the full range of silvicultural and harvest systems may be used to accomplish vegetation management objectives. However, some alternatives may result in more or less use of particular silvicultural prescriptions or logging systems than others.

For purposes of this analysis, it is assumed that the Forest Service will offer a national sale program of 3-4 billion board feet through each of the next five years and into the foreseeable future. Any substantial increase in funding for forest health improvement is likely to produce an increase in volume offered above that range.

Old Growth - While the amount of old-growth forest within roadless areas has not been inventoried, it is assumed that a prohibition of road construction and reconstruction would result in some old-growth forests being protected. Alternatives that prohibit timber harvest would protect the maximum amount of old-growth forest within the inventoried roadless areas. Alternative 4 provides the most protection for old-growth forests, while Alternative 1 provides the least.

Special Forest Products - The proposed prohibition would not affect the current level of removal of special forest products, as current access is adequate to meet current demand. Roads are not constructed or reconstructed solely for the removal of special forest products. Over time as demand for these products increases, Alternative 1 may provide slightly more access than other alternatives for harvest of special forest products as new

roads are constructed. More information on special forest products is available in Chapter 3, *Social and Economic Factors*, of the FEIS, and in the Socio-Economic Specialist Report.

Prohibition Alternatives

Alternative 1 – No Action

No rule prohibiting activities in inventoried roadless areas would be issued. Management of inventoried roadless areas would continue under the direction of current forest plans and applicable national and regional policy. Road construction and reconstruction would be prohibited only where current land management plans prohibit such action. Road construction and timber harvest, for both commodity and forest stewardship purposes, would be used within these areas to achieve vegetation management objectives.

Timber Harvest

Under Alternative 1, timber harvest in inventoried roadless areas would continue under the direction of current land management plans and national and regional policy. Given the recent trend of increased stewardship-purpose timber sales, 60% or more of the acres and 50% to 60% or more of volume offered is likely to be stewardship-purpose timber sales (as defined by TSPIRS, the Timber Sale Reporting Information System). About 30% to 40% of volume offered would be commodity-purpose timber sales, and roughly 5% to 10% of volume offered would be personal-use purpose sales. The full range of silvicultural and harvest systems would be considered to accomplish vegetation management objectives.

Both even-aged and uneven-aged silvicultural systems may be used under this alternative. Methods would be determined at local levels based on further site-specific analysis. When even-aged management is used, shelterwood and seed-tree prescriptions are more

Table 6. Projected timber offer and planned road construction in inventoried roadless areas for 5 years, by Forest Service region. Construction mileages include new, reconstructed, and temporary roads.

Region	Projected timber offer (MMBF ^a)	Projected acres harvested (thousand acres)	Projected timber- related road construction (miles)
Northern (1)	85	10	52
Rocky Mountain (2)	48	7	58
Southwestern (3)	3	0.6	3
Intermountain (4)	201	25	117
Pacific Southwest (5)	33	4	10
Pacific Northwest (6)	87	17	19
Southern (8)	30	6	26
Eastern (9)	78	11	47
Alaska (10)	539	14	291
Total	1,104	94.6	623

^a Million board feet
(Roadless Database 2000)

likely to be used than clearcutting, except in Alaska where clearcutting is expected to be the most commonly used harvesting practice. Uneven-aged management uses single tree or group selection, or a combination of these systems. Pre-commercial and commercial thinning would be used in both even- and uneven-aged systems. Salvage and sanitation cutting under both even- and uneven-aged systems would be used where consistent with other resource needs, such as the retention of standing dead or large, down woody material. Logging systems are likely to include ground-based (tractor, forwarder), cable and helicopter.

Substantially more salvage harvest is likely to occur over time in inventoried roadless areas under this alternative, as road construction and timber harvest may be used to recover the usable volume from fire, insect, disease, and wind damage and to reduce fuel loading. This alternative is likely to result in more pre-commercial thinning, intermediate thinning, and other silvicultural treatments to manage forested landscapes for a variety of purposes over time than under Alternatives 2 through 4.

Approximately 90,000 to 95,000 acres are likely to be harvested in inventoried roadless areas in the first 5-year period. This is an annual average of about 18,000 to 19,000 acres harvested from a suitable land base of approximately 9 million acres within inventoried roadless areas. About 15% of the volume and harvest acres are within 2.8 million acres where roads already exist.

Nationwide, approximately 1.1 BBF could be offered in inventoried roadless areas over the first 5-year period. It would be necessary to construct or reconstruct about 445 miles of classified road, and about 177 miles of temporary road to harvest about 800 MMBF.

The remaining timber could be harvested without new or reconstructed roads. This alternative would result in the highest potential level of road construction and timber harvest of all alternatives. During this first 5-year period, timber harvest and road construction could occur on approximately 0.3% of the total inventoried roadless areas nationwide on the land base where current land management plans allow road construction to occur.

From past Agency experience, the estimated volume of 1.1 BBF could be reduced by as much as 30% before harvest due to results of site-specific analyses, statistical variation in inventories and volume estimates, NEPA process delays, litigation, or difficulties in completing the sale preparation process.

Slightly more than half of that volume, 565 MMBF, would be offered by the national forests in the lower 48 states. Average annual offer by these forests would be about 113 MMBF, compared to the 73 MMBF annual average offered over the past seven years (1993-1999). About half of the estimated volume is expected to come from trees killed by insects, disease or wildfire.

Tongass National Forest – The Tongass National Forest would offer nearly half of the national timber sale program in inventoried roadless areas. This would be 539 MMBF from approximately 14,000 acres, over the next 5 years, primarily using clearcutting. This is about 0.4% of the inventoried roadless area acres on the Tongass National Forest where road construction is permitted by the current land management plan. All of this volume would be considered commodity-purpose timber harvest.

Long-term Effects on Timber Harvest – Projections of future harvest, beginning in 2005, are made for Alternative 1 recognizing that there are high levels of uncertainty about the Agency's ability to continue harvesting timber for any purpose from these areas. Approximately 130 to 160 MMBF of timber would be sold each year from 2005 through 2040 from 13,000 to 15,500 acres in inventoried roadless areas. The Tongass National Forest would account for about half to two-thirds of the projected volume.

Given the scope of the forest health problem, the controversy associated with inventoried roadless areas, and the cost of building new roads, it is likely that higher priority for treatment to reduce the impacts of insects and disease would be assigned to roaded areas than to inventoried roadless areas.

Forest Health - Insects and Disease

Road construction and timber harvest would continue to be used, consistent with land management plan direction, to treat a portion of high-priority stands within inventoried roadless areas that are at risk of insect or disease mortality where stand location and other factors make timber harvest economically feasible.

Under this alternative, timber harvest could be used to improve forest health conditions (e.g., suppressing insect infestation, thinning to improve stand vigor, or fuels reduction) on an estimated 18,000 to 19,000 acres per year in inventoried roadless areas during the first 5 years following rule implementation. This acreage is based on the assumption that

forests' projected volume to be sold within inventoried roadless areas would be sold, and that one of the resource management objectives that timber harvest will accomplish is improvement of forest health.

New road construction or reconstruction would reduce the cost per acre of mechanical treatment needed to achieve resource objectives or desired conditions. New road construction or reconstruction would provide closer access for equipment and vehicles to accomplish timber harvest, fuels reduction, or other stand treatment activities. Depending on the distance from the nearest road and the size and quantity of material removed, per-acre costs for stand treatments are likely to be higher in unroaded areas than in roaded areas. This is due to lower production rates in unroaded areas for moving logs, whole trees, or bundles of trees from the stump to the landing. Roads are further from where the trees are removed or where the work is actually done. Skidders must travel longer distances, other equipment must travel further from the road to the job site, and work crews must walk farther. Total management costs of multiple treatments over time, when road construction is prohibited, may be higher than comparable situations where road construction is permitted. This includes consideration of road construction and maintenance costs.

It is unlikely that national forest managers would have any substantive impact on insect and disease condition over the next 5 years. Over the next 20 to 40 years, though, this alternative is likely to be substantially more effective in reducing insect and disease problems than any of the other alternatives. For management entry into inventoried roadless areas, it's likely that highest priority would be given to selecting stands for treatment within approximately 870,000 acres where high insect, disease and catastrophic fire risk overlap. In this longer term, we would expect an average of 13,000 to 15,500 acres of timber harvest per year within inventoried roadless areas that would help improve forest health. However, the Agency may still be unable to treat many of these acres because of limited budgets, resource concerns, the high cost of road construction, and increasing levels of public controversy over roadless area management. Site-specific project analysis would determine which and how many acres receive treatment.

Alternative 1 would allow a higher level of timber harvest in inventoried roadless areas than the other alternatives. This would produce higher revenues, resulting in more funds for Brush Disposal (BD) and Knutson-Vandenberg (K-V) collections. These funds are collected from timber sale receipts and could be used for fuel reduction and thinning that otherwise would require appropriated funds.

Alternative 2

Road construction and reconstruction, including temporary road construction, would be prohibited within inventoried roadless areas. All timber harvest as provided for under current national forest land management plans would be allowed. The full range of silvicultural and harvest systems may be used to accomplish vegetation management objectives. Skidding and yarding of trees and logs is permitted.

Timber Harvest

Under Alternative 2, timber harvest consistent with land management-plan prescriptions, standards and guidelines would continue, while road construction and reconstruction would be prohibited within all inventoried roadless areas. A split between commodity, stewardship, and personal use timber-sale volumes similar to that under Alternative 1 is expected under this alternative. The full range of silvicultural and harvest systems would be considered to accomplish vegetation management objectives.

Both even-aged and uneven-aged management may be used under this alternative. Shelterwood and seed-tree prescriptions are more likely to be used than clearcutting, except in Alaska where clearcutting is expected to be the most commonly used harvesting practice. Timber harvest objectives and silvicultural prescriptions would generally be the same as those under Alternative 1. Helicopter yarding may be used more often under this alternative than under Alternative 1 due to the prohibition on road construction and reconstruction.

Nationally, about 300 MMBF would likely be offered from about 40,000 acres in inventoried roadless areas over the first 5-year period. About 0.1% of the acres in inventoried roadless areas where current land management plans allow timber harvest would be harvested. Under this alternative, there would be a timber offer volume reduction of slightly more than 800 MMBF (73%) within inventoried roadless areas over the 5-year period, compared to Alternative 1, due to the prohibition on road construction and reconstruction. The estimated annual offer volume reduction of 160 MMBF is 5% of the projected total national program of 3.3 BBF. The estimated offer volume of 300 MMBF could be reduced before harvest by as much as 30% due to results of site-specific analyses, NEPA process delays, litigation, or difficulties in completing the sale preparation process.

The effects of a prohibition on road construction and reconstruction on the mix of stewardship and commodity purpose timber harvest are largely unknown. Salvage volume could be removed when consistent with land management plan direction, though only areas near existing roads, high volumes per acre, or high-value species within a mile of the nearest road that could be yarded with helicopters would be economically feasible to harvest. Consequently, with no opportunity for new road construction, substantially less salvage volume from fire, insect, disease, and wind damage is expected under this alternative than under Alternative 1. This alternative would likely result in much less pre-commercial thinning, intermediate thinning, and other silvicultural treatments to manage forested landscapes for a variety of purposes, because fewer acres within inventoried roadless areas will be economically accessible for timber harvest.

The largest reductions in volume offered and area harvested over the 5-year period would occur in Region 10 (512 MMBF and about 13,000 acres harvested) and Region 4 (134 MMBF and about 17,000 acres harvested). Prohibition of road construction and reconstruction would have the greatest volume impacts on the Tongass National Forest in Alaska, the Idaho Panhandle and Payette National Forests in Idaho, the Dixie and Manti-

La Sal National Forests in Utah, and the Superior National Forest in Minnesota.

Under Alternative 2, timber harvest objectives and silvicultural prescriptions would generally be the same as those under Alternative 1. Timber harvest could be used in areas adjacent to roads, in areas where forwarders could operate to move products long distances to roads or off-road landings where skyline yarders or helicopters could swing logs or trees to the nearest roads, or in areas where helicopter or skyline yarding is feasible. The prohibition on road construction and reconstruction would increase timber harvest costs or costs of silvicultural or fuels reduction activities usually accomplished by service contract or means other than a timber sale contract. In the Pacific Northwest, logging costs for helicopter yarding are three to five times higher than those for tractor yarding the same ground; cable yarding costs are twice that of tractor yarding costs under the same conditions (Reutebuch personal communication). In Montana, the cost of cable yarding is roughly twice that of tractor skidding and approximately 50% higher than using forwarders. Helicopter yarding is roughly three times the cost of tractor yarding and twice that of using forwarders (Keegan and others 1995). Helicopter timber harvest feasibility depends on many factors, including value, log size, and volume per acre of timber removed. Generally, helicopter yarding is not feasible at distances of more than one-half to three-quarters of a mile from the nearest road. Topography and location of existing roads directly affects the feasibility of timber harvest when using helicopters or cable systems. Since this alternative provides for timber harvest for commodity purposes, harvest of the larger and higher-value trees would generate more revenue that would offset the higher helicopter logging costs compared to Alternative 3. Timber harvest costs, or costs of silvicultural or fuels reduction activities usually accomplished by service contract or means other than a timber sale contract, would rise with a prohibition of road construction and reconstruction.

Due to less road access, Alternative 2 would likely result in less intermediate thinning within inventoried roadless areas to improve growth and yield (growing and harvesting more volume per acre over time) than under Alternative 1. Alternative 2 would result in more intermediate thinning for the same purpose than under Alternative 3, which does not permit commodity-purpose timber harvest in inventoried roadless areas.

Salvage of trees killed by fire, insects, disease or windthrow within inventoried roadless areas is expected to continue at a lower level than under Alternative 1 due to the road construction and reconstruction prohibition. The elimination of future constructed or reconstructed road access to dead or dying trees increases costs to remove these trees. More salvage is likely to occur under this alternative than under Alternative 3 because commodity-purpose timber harvest may still be used to recover the usable volume from fire, insect, disease and wind damage as well as to reduce fuel loading over time. In general, trees near existing roads or high value species that could be yarded with helicopters would be the most economically feasible to harvest. However, service contracts paid by appropriated funding could be used in those situations when traditional timber sale contracts are not economically feasible.

Approximately 40,000 acres could be harvested in inventoried roadless areas over the first 5-year period. This is an annual average of about 8,000 acres harvested from a land base suitable for timber production of approximately 9 million acres in inventoried

roadless areas. Roughly one third of the volume and harvest acres are within 2.8 million acres of inventoried roadless areas where roads already exist.

Long-term Effects on Timber Harvest – Projections of future harvest beginning in 2005 are made for Alternative 2 recognizing that there are high levels of public controversy and uncertainty about the Agency's ability to continue harvesting timber from these areas. Approximately 35 to 44 MMBF of timber would be sold each year from 2005 through 2040 from between 3,000 and 4,200 acres in inventoried roadless areas. Most of the volume and area harvested would be within the roaded portion of inventoried roadless areas. The volumes offered within inventoried roadless areas are expected to decline slowly as forest plan revisions allocate more of these lands to management prescriptions that either reduce or prohibit timber harvest, and decommission roads within the inventoried roadless areas.

Forest Health - Insects and Disease

Under Alternative 2, timber harvest not requiring new road construction or reconstruction would be used to accomplish forest health improvement objectives (e.g., suppressing insect infestation, thinning to improve stand vigor to increase resistance to disease and insects, fuels reduction) on an estimated 8,000 acres per year in inventoried roadless areas during the first 5 years following rule implementation. Much of the volume to be offered within inventoried roadless areas is expected to come from the roaded portions of these areas. Compared to Alternative 1, fewer acres of forest health treatment would be accomplished under this alternative because road construction is prohibited. This is a reduction of 50,000-55,000 acres nationally from the potential forest health improvement work that may be accomplished under Alternative 1, and is a direct reflection of timber harvest acres, currently planned for the next five year, which would no longer be economically feasible using traditional timber sale contracts without road construction or reconstruction.

Highest priority for forest health treatment is likely to be given to the most accessible portions of 870,000 acres where high insect, disease and catastrophic fire risk overlap. These priority acres within inventoried roadless areas would be evaluated against stands in similar conditions in roaded areas to determine where limited funding is best allocated to achieve the most cost-effective treatment.

Acres of forest health improvement accomplished under Alternative 2 within inventoried roadless areas over the long term are likely to be lower than those under Alternative 1 because of higher unit costs for mechanical thinning and other stand treatments associated with 806 fewer miles of road access. This difference in potential accomplishment could be lessened with higher levels of appropriated funding for this kind of work.

In the long term, beyond the first 5 years, 3,000 to 4,200 acres per year may be accomplished by timber harvest to improve forest health, reflecting higher costs over time as forest lands nearest to existing roads are treated first.

Alternative 3

Under Alternative 3, road construction and reconstruction, including temporary road construction, would be prohibited within inventoried roadless areas. Timber harvest would be prohibited except for stewardship purposes. Stewardship-purpose timber harvest can be used only where it maintains or improves roadless characteristics and:

- Improves threatened, endangered, proposed or sensitive species habitat;
- Reduces the risk of uncharacteristically intense fire; or
- Restores ecological structure, function, processes or structure

This alternative differs from Alternative 2 in that commodity-purpose timber sales and some categories of stewardship-purpose sales as defined by TSPIRS would not be allowed in inventoried roadless areas. Silvicultural prescriptions would focus primarily on thinning from below to reduce the spread of insects and disease and to reduce fuel loading. Skidding and yarding of trees and logs is permitted.

Timber Harvest

Approximately 90% to 95% of timber harvest would be for stewardship purposes; 5% to 10% would be for personal use such as firewood cutting. Both even-aged and uneven-aged management may be used under this alternative, provided it meets the intent of stewardship purpose described above.

Timber harvest objectives within inventoried roadless areas would focus on restoration of sustainable vegetation conditions, improving forest health, reducing excessive fuels and associated wildland fire risk and intensity, reducing insect and disease conditions that are outside the natural range of variability, and improving habitat for wildlife. The same kinds of silvicultural prescriptions as described under Alternatives 1 and 2 are likely to be used under this alternative, with a higher proportion of thinning being used to accomplish stewardship objectives. Salvage, when used to accomplish one or more of the objectives under this alternative, is likely to be used most often for excessive fuels reduction and insect and disease suppression.

An estimated 160 MMBF would be offered for sale in inventoried roadless areas nationwide during the first 5-year period. This is approximately 0.07% of the inventoried roadless areas with land management plan directions that allow road construction. This 85% reduction of inventoried roadless area volume from 1.1 BBF planned over the first 5-year period under Alternative 1 is due to the prohibition on road construction, reconstruction, and commodity-purpose timber harvest. The estimated annual offer volume reduction of 190 MMBF is 6% of the projected total national program of 3.3 BBF. This planned offer volume could be reduced before harvest by as much as 30% due to results of site-specific analyses, NEPA process delays, litigation, or difficulties in completing the sale preparation process. Much of the small amount of volume to be offered within inventoried roadless areas is expected to come from the roaded portions of

these areas.

Approximately 22,000 acres could be harvested in inventoried roadless areas over the first 5-year period. This is an annual average of about 4,400 acres harvested from a land base suitable for timber production of approximately 9 million acres currently available in inventoried roadless areas. About half of the volume and harvest acres are within 2.8 million acres of inventoried roadless areas where roads already exist.

Impacts on Costs and Accomplishment – Under this alternative, unit costs for contracts designed to reduce fuels through mechanical thinning and prescribed burning in inventoried roadless areas would be higher than those under Alternatives 1 and 2. The smaller diameter trees that are removed and sold would have lower value and would cause the sale to be less economically feasible than if commodity-purpose timber harvest is available. Fewer acres of thinning would be accomplished using timber sale contracts under this alternative than would be likely under Alternatives 1 and 2. While thinning and other stand treatments may also be accomplished through service contracts, cost per acre is expected to rise in direct proportion to distance from the nearest road.

Long-term Effects on Timber Harvest – Projections of future harvest beginning in 2005 are made for Alternative 3 recognizing that there are high levels of public controversy and uncertainty about the Agency's ability to continue harvesting timber from these areas. Approximately 12 to 15 MMBF of timber would be sold each year from 1200 to 1400 acres in inventoried roadless areas.

Forest Health - Insects and Disease

Under Alternative 3, forest health treatment activities would be similar to those in Alternative 2. Timber harvest for stewardship purposes would be used to accomplish forest health improvement objectives (such as suppressing insect infestation, reducing the spread of disease, or thinning for fuels reduction) on an estimated average of 4,400 acres per year in inventoried roadless areas during the first 5 years following rule implementation. Compared to Alternatives 1 and 2, fewer acres of forest health treatment would be accomplished under this alternative because treatment cost per acre would be substantially higher due to the road construction prohibition and lower harvest volumes per acre.

Less work would be done using timber sale contracts because the smaller-diameter, lower-value trees would likely result in fewer economically viable timber sales. More forest health objectives would have to be accomplished using service contracts or means other than timber sale contracts, which would require more appropriated funds. In the long term, beyond the first 5 years, 1,200 to 1,400 acres per year may be accomplished by timber harvest to improve forest health, reflecting higher cost over time as forest lands nearest to existing roads are treated first.

Alternative 4

Road construction, reconstruction, and timber harvest for commodity and stewardship

purposes would be prohibited in inventoried roadless areas. Personal use harvest, including firewood and Christmas trees, would be permitted. Exceptions to the prohibition on timber harvest may be authorized by the responsible official if it is determined that such harvest is necessary: 1) to prevent degradation or loss of habitat if that loss or degradation would increase the risk of extinction for a threatened or endangered species, or for a species that has been proposed for listing; or 2) to promote recovery of a threatened or endangered species.

Timber Harvest

No timber volume would be offered in inventoried roadless areas during the first 5-year period or beyond. This potential reduction of 1.1 BBF and 90,000 to 95,000 harvest acres over the first five years from Alternative 1 would be due to the prohibition of road construction, reconstruction, and all timber harvest.

The entire 1.1 BBF currently planned to be offered for sale over the next five years within all inventoried roadless areas will not be offered for sale. This reduction is about 7% of total National Forest System timber volume expected to be offered during the same period. The national timber offer program is expected to remain relatively stable within a range of 3 to 4 BBF per year.

Acreage suitable for timber production within inventoried roadless areas, currently about 9 million acres, would be removed from the suitable timber base as part of the national forest land management planning process to account for this change in land allocation.

Forest Health - Insects and Disease

With timber harvest, road construction and reconstruction prohibited in inventoried roadless areas, this alternative would provide little opportunity to improve forest health conditions within inventoried roadless areas. Insect infestation and disease epidemics would run their course. None of the acres treated under the other alternatives would be treated under Alternative 4.

Tongass National Forest Alternatives

The following are four alternative ways to apply the prohibition alternatives to the Tongass National Forest, and a summary of the effects of implementing each:

Tongass Not Exempt: The prohibition alternative selected for the rest of the National Forest System lands would apply to the Tongass National Forest. The final rule may include a social and economic mitigation measure which would delay implementation of the final rule on the Tongass in 2004.

Effects: Under the road construction and reconstruction prohibitions of this alternative, the forest would likely offer 27 MMBF harvested from about 700 acres over the first five-year period. This is a 95% volume reduction to the Tongass National Forest from the Tongass Exempt Alternative. If the final rule includes a social and economic mitigation

measure, the Tongass National Forest would offer approximately 539 MMBF over FY 00-04.

Tongass Exempt: The prohibition alternative selected for the rest of the National Forest System lands would not apply to the Tongass National Forest.

Effects: The Tongass National Forest currently plans to offer nearly half of the national timber sale program scheduled within inventoried roadless areas, 539 million board feet, over the next five years. Most of that volume will be produced through the use of clearcutting as the optimum method of harvest. Over the longer term, the forest expects to offer roughly 100 MMBF per year from inventoried roadless areas.

Tongass Deferred: No prohibition alternative would be applied on the Tongass National Forest at this time. The Responsible Official would determine whether the prohibition on road construction and reconstruction should apply to any or all of the inventoried roadless areas on the Tongass as part of the 5-year Forest Plan review beginning in 2004.

Effects: The effects are the same as the Tongass Exempt Alternative above over the first five-year period. If prohibitions on road construction and reconstruction are implemented at the five-year forest plan review, effects will be the same as the Tongass Not Exempt Alternative over the long term.

Tongass Selected Areas: Road construction and reconstruction would be prohibited within four land use designations on the Tongass: Old Growth, Semi-Remote Recreation, Remote Recreation, and LUD II.

Effects: Effects of implementing this alternative are discussed in the Effects of the Tongass National Forest Alternatives section within Chapter 3 of the DEIS. Estimated timber volume to be offered for sale by the Tongass NF would be reduced by approximately 241 MMBF over the first five year period, and reduced by about 50 MMBF over the second five year period, by implementing this alternative.

For additional information about the Tongass National Forest alternatives, or the effects of implementing these alternatives, see the Tongass Biological Resources and Socio-Economic Specialist Reports.

Indirect and Cumulative Effects on Timber Harvest and Insects and Disease

Past Actions-Forest Health – The combined incremental effects of wildland fire suppression and reductions in timber harvest from Federal lands have led to a change in vegetation structure and species composition and an increasing accumulation of forest fuels over large landscapes of most of the interior West, including inventoried roadless areas. Removal of timber from NFS lands in 1996 was approximately 20% of growth that

year (USDA Forest Service 1999b). While the 1996 rate of removal is not a current annual average, it indicates an ongoing and substantial net increase in volume of wood fiber, and therefore a substantial increase in natural fuels, on NFS lands.

Past and Present Actions-Timber Trends. The National Forest System contribution to the nation's need for wood products has been in decline during the past decade. Sawtimber harvest on national forests has dropped from a 1988 high of 27% of the nation's softwood lumber production to approximately 5% of that production in 1999. The harvest level of the 1980s was not sustainable in light of public issues and conflicts with other management objectives. The Agency believes that its annual contribution will stabilize between 3 and 4 BBF. During this decline in available timber resources from NFS lands, softwood consumption nationally has increased.

Suitable Lands – Land management plan revisions in recent years have shown a decreasing trend in acres designated as suitable for timber production due to allocations to other uses or environmental concerns. Examples of these uses and concerns include endangered species, water quality, wildlife habitat, scenic quality, recreation, and reforestation capabilities. Total acres suitable for timber production on all NFS lands, including inventoried roadless areas, have dropped from approximately 63 million acres in 1987 to roughly 47 million acres in 1999.

It is reasonably foreseeable that this trend will continue. Acres suitable for timber production will be recalculated during each national forest's next land management plan revision. As those plan revisions are made, certain areas within inventoried roadless areas will likely be eliminated from the suitable land base under Alternatives 1, 2, and 3 due to the same concerns mentioned in the previous paragraph. Under Alternatives 2 and 3, additional areas are likely to be dropped from the suitable base because of lack of access and economic feasibility. With a prohibition on all timber harvest under Alternative 4, land management plan revisions will likely determine that there are no acres suitable for timber production within inventoried roadless areas.

Forest Plan ASQ – In the past, it has been difficult for the Agency to harvest timber in inventoried roadless areas, primarily because of high levels of public controversy. Concerns have been expressed that this could lead to increased and disproportional harvest on roaded lands to meet ASQ levels. The importance of the inventoried roadless area volume to a forest's ASQ depends on when the area was scheduled to be harvested in the land management plan. If most of the volume uncut on a forest is in inventoried roadless areas, then these areas may have been critical to meeting current forest timber production objectives. However, regardless of this rulemaking, it is unlikely that there will be any substantial increase in road miles constructed or timber volume sold within inventoried roadless areas due to public controversy, appeals, and litigation. Table 2 displays declining forest ASQ as a result of recent land management plan revisions. It is reasonably foreseeable that, as land management plans are revised, future limitations on timber harvest under the new forest planning regulations (November, 2000) may be adjusted downward further in response to changes in suitable acres as previously discussed.

Softwood Lumber Production, Import, and Consumption – National consumption of softwood lumber has steadily increased from 1990 (45.7 BBF) to 1999 (54.5 BBF). While the average family size in the United States has decreased 16% since 1970, the average single-family home being built today has increased by 48% (MacCleery, 2000). The difference between production and the higher levels of consumption are accounted for by increases in timber product imports from other countries. Softwood lumber imports have risen from 14.2 BBF in 1987 to 19.2 BBF in 1999. More than 95% of current softwood lumber imports are from Canada.

Present Actions-Forest Health – The primary cumulative impact of Alternatives 2, 3 and 4, when added to other past, present and reasonably foreseeable future actions, is the continuing change in vegetation structure and species composition, and the accumulation of vegetation and forest fuels. Prohibition of road construction and reconstruction within inventoried roadless areas would result in a large proportion of inventoried roadless area acres remaining largely inaccessible (due to lack of economic feasibility) to equipment necessary to accomplish vegetation management. Some of these lands are unsuitable for timber production; on other lands, road construction is not currently economically feasible. Most lands within one-quarter to one-half mile of an existing road would continue to be managed using timber harvest or other methods of treatment where appropriate. However, cost per acre would increase substantially and proportionally with distance of the project from the nearest road. Total acres treated within inventoried roadless areas are likely to be less than if road construction is permitted. Trees inside these economically inaccessible (under Alternatives 2 and 3) portions of inventoried roadless areas that are killed by insects, disease, windthrow, or fire would deteriorate and add to fuel loading. Wildland fires that subsequently burn these areas may cause severe impacts to soil and water resources because higher concentrations of natural fuels would cause the fire to burn hotter. However, even if road construction and reconstruction in inventoried roadless areas were permitted, it may not be possible to treat many of these acres because of resource concerns, the high cost of road construction, and public controversy.

Present Actions-Timber Harvest – NFS lands contribute approximately 5% of the nation's total timber harvest from all ownerships. In the face of stable or increasing per-capita consumption in the United States, the effect of the shift to ecological sustainability on United States public lands has been to shift the burden and impacts of that consumption to ecosystems somewhere else – to private lands in the United States or to lands of other countries (MacCleery, 2000). Implementation of Alternatives 2, 3, or 4 will add to that shift. Volume reductions from national forest inventoried roadless areas in the short term would likely be offset by increases in timber harvest on private lands in the United States and in other countries.

Longer term, given the increasing demand (roughly 1% to 3% annually) for wood products in the United States, the situation is more uncertain. The anticipated Agency timber program (timber volumes sold and harvested are assumed to be equal), projected out 20 and 40 years under a prohibition on road construction and reconstruction in inventoried roadless areas, is estimated at roughly 130 to 160 MMBF per year. This estimate recognizes the uncertainty that large areas of currently suitable lands in the

inventoried roadless areas, which may have larger ASQs under land management plans now, may be unavailable for future timber harvest due to continuing public controversy.

Compared to Alternative 1, the indirect and cumulative effects of Alternative 2, and to a greater degree Alternative 3, would likely include a decrease, over time, in acres treated for fuel reduction and other stewardship purposes, and a corresponding reduction in timber volume offered, sold, and harvested. This is due to the cost increase for thinning and other forest-health improvement treatments accomplished without road access, and the negative effect those cost increases are likely to have on future funding priority and actual acres accomplished. However, this decrease may occur because of other agency actions. The Cohesive Strategy, for example, would place priority for fuel treatment on the wildland-urban interface, readily accessible municipal watersheds, and threatened and endangered species habitat. Inventoried roadless areas, because they are generally not near areas of human habitation, would rarely receive high priority for fuels reduction given these other priorities.

Other Federal Initiatives – Other agency and Federal proposals will continue to affect the Forest Service timber program at the national and local levels. Current emphasis like that found in the Interior Columbia Basin Ecosystem Management Project, the Sierra Nevada Framework, and the Cohesive Fire Strategy calls for a mix of longer rotation periods to increase old-growth characteristics, and thinning treatments that would continue the removal of small diameter trees. Other strategies like the Lynx Conservation Assessment and Strategy call for preservation of early seral stage habitat that would preclude some future thinning activities. The balancing and stabilizing of the timber program will happen locally through the collaboration processes envisioned in the Agency's new planning regulations at the land management plan and project level. Overall, it is anticipated that the national program will remain between 3 and 4 BBF, with periodic variations due to salvage after major natural disasters that temporarily increase timber harvest, or emerging issues that decrease certain harvest activities until an appropriate solution is developed.

Reasonably Foreseeable Future Action – Natural disasters such as wildland fires, windstorms, and insect outbreaks will continue to occur, and the Agency is likely to continue salvaging a portion of the dead and dying trees. These salvage sales will continue to be designated as high priority for harvest due to biological and economic factors. The biological factor is the need to control secondary insect outbreaks, like Ips beetle, southern pine beetle and spruce bark beetle, whose populations would increase rapidly by attacking damaged trees and then spreading into the surrounding healthy trees. The economic factor is the rapid deterioration of the dead material due to insect damage, stains, decay, and checking. If dead or dying trees are not salvaged quickly, there will be little merchantable material remaining to salvage.

Timber salvage sales generate vegetation management work completed on the ground and receipts to the Federal treasury from the sale of usable trees. A portion of the money collected from the resulting timber salvage sales is used to help cover the costs of essential rehabilitation work and reforestation. If the Agency elects to reduce the use of timber salvage sales because of continuing public controversy, the use of service contracts funded by appropriations must increase to accomplish fuels reduction or other

desired vegetative treatments. Net cost per acre to achieve desired conditions rises substantially over that associated with use of timber salvage. The higher cost may be a disincentive to achieving desired conditions within inventoried roadless areas.

Wildland fires and other natural disasters, especially during a fire season like that experienced in 2000 in the West, will also eliminate or devalue the timber on some timber sales currently under contract and some that were planned but not offered for sale. However, it is anticipated that the acres of vegetation management that otherwise would have been accomplished through timber harvest will be recovered or slightly increased due to restoration and salvage operations over the next 2 years. This would likely create a slight rise in the Agency's timber offer, similar to the period of 1995 to 1997. A proportionate decrease in timber offer would occur after those 2 years as the individual forest shifts from the salvage emphasis back to its regular timber planning cycle.

It is also anticipated that America's lumber consumption trend will continue to rise over the next 40 years and beyond at a rate of increase of 1% to 3% annually, as will consumption of all wood products. With the Forest Service sustaining an average harvest level of between 3 and 4 BBF for the next 40 years, the Agency's volume contribution to the nation's lumber supply will remain stable (actually decreasing in proportion to other sources) as consumption increases. This means that harvest levels will continue to increase on private forestland to help meet the demand. The RPA Assessment projections for the next 30 to 40 years indicate that the South will continue to be the main source of increased softwood production nationally to the point that softwood lumber imports may decline slightly. Transition is projected to take place between the years 2000 and 2020 (Darr personal communication).

Imports are expected to continue to increase from Canada's boreal forests, especially from Quebec, Alberta, and the Atlantic Provinces, as there is no anticipated future decline in American consumer demand for wood products for construction and pulp in the future. There is no anticipated substitution of hardwood imports for softwood imports. Therefore, the prohibition alternatives would not cause an indirect or cumulative effect to tropical hardwood forests like the Amazon and Southeast Asia. Exports are expected to remain near or below the current level. Any increase in importing to meet demand would proportionately increase the nation's trade deficit.

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Appendix A: Projected Long-Term Harvest from Inventoried Roadless Areas

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Projected Harvest from Inventoried Roadless Areas

Background

Data used in this analysis are from the National Data Summary tables derived and assembled by the Roadless Conservation Rule IDT, file names <vol_and_acre_projection08-26-00.xls> and <planed_offer_summary_082500.xls>.

It is difficult to accurately project the future harvest level from roadless areas on lands managed by the national forests as policy issues remain fluid, and there is great national debate about how these areas should be managed. Recent (1998 and 1999) timber sales sold within roadless areas are substantially below the average of prior years. This probably reflects both continued controversy over roadless area management and the effects of the interim roads policy instituted in 1998. The large number of wildfires in CY 2000 will present opportunities for large amounts of salvage where management direction permits this to occur. Various analyses have indicated there will be increasingly large and severe wildfires through out the western states as a result of accumulated biomass within dryer forest types (draft Cohesive Strategy, 2000) (GAO/RCED-99-65, 1999). These fires will continue to provide impetus for large scale salvage within roadless areas.

For the purposes of this analysis, volume actually sold will be used as a surrogate for volume harvested. During the five year period between 1993 and 1997, sold volume fluctuated by about 45% around the mean, with lower volumes occurring during 1994 and 1995. During 1994 and 1995 several major policy changes were in the initial stages of implementation in the western United States. These policy changes resulted in substantial review, revision, and delay of several timber related projects, resulting in a decline in volume sold in the largest timber producing regions of the Forest Service. For example, Region 6 was engaged in initial implementation of Regional Forester's Amendment Number 2 to Eastside Forest Plans; Regions 5 and 6 were engaged in initial implementation of the President's Northwest Forest Plan; PACFISH and INFISH were in the initial stages of implementation throughout the Columbia River Basin; and Region 10 was engaged in finalizing the Tongass Plan. An increase in volume sold occurred in 1996 and 1997 due to the Rescission Act. The additional volume facilitated by this Act probably would have been sold regardless, and therefore is indicative of total volume production attainable from roadless areas.

Stable direction is assumed to occur under each of the alternative projections described below. It is assumed for all alternatives that timber harvest at the average annual rates projected would occur between 2005 and 2040 under Alternatives 1, 2, and 3.

Alternative 1 (No Action)

This alternative would continue existing Land and Resource Management Plan (forest plan) direction for inventoried and uninventoried roadless areas. Recent decisions that amended existing forest plans include the President's Northwest Forest Plan for portions of California, Oregon, and Washington that are within the range of the northern spotted owl; Regional Foresters Amendment Number 2 to eastside forest plans in Region 6; as well as PACFISH and INFISH that amended existing forest plans within the Columbia River Basin. Further modification of forest plan direction is an expected outcome of the Sierra Nevada Framework and the Interior Columbia River Basin Ecosystem Management Project.

For analysis purposes the following assumptions are made:

1. There are several reasons why the original forest plan projections for roadless area entry cannot be realized.
 - a. Volume harvested and acres treated would continue to be affected by controversy. Appeals, litigation, and protests will continue in the absence of a national consensus on roadless area management. This will provide impetus for future policy initiatives in the future.
 - b. New direction implemented since forest plans were approved between 1985 and 1997 will mediate volumes and acres projected in older plans. One example of new direction is the Northwest Forest Plan (1994) that significantly reduced harvest levels in the Pacific Northwest and in northern California within the range of the northern spotted owl. Other examples of decisions that have affected the national forest harvest levels are the Regional Forester's Amendment Number 2 to Eastside Forest Plans in the Pacific Northwest Region (1995), as well as PACFISH (1994) and INFISH (1995) that affected substantial acreages managed by national forests throughout the Columbia River Basin in several Forest Service Regions.
2. Entries into inventoried roadless areas would probably be similar to what occurred between 1993 and 1997 before the interim rule was put in place. The volume of timber sold in Fiscal Years 1996 and 1997 was substantially higher than for any of the previous three years, indicating that national forests were successfully making program adjustments to address the new, post forest plan changes in management direction. The Rescission Act also contributed to higher sell volumes from national forests.
3. A range of acreage estimates will be based on the spread of volume estimates developed based on TSPIRS reported accomplishments (Williams, no date) and an analysis of the roadless evaluation appendices within a sample of approved forest plans (Townsend, 08/25/00). These estimates are believed to be indicative of the upper and lower bounds of harvest at the national level.
4. Harvest is assumed to continue into the future beyond 2040. If necessary, the average annual projection of volume could extend into the future. There is little risk of exceeding the theoretical sustained yield capacity given the relatively low

volume likely to be harvested compared to either the inventory of volume within roadless areas, or the potential for growth within these areas.

Two projections are made for each alternative. Both are below the amounts projected in existing forest plans for the reasons stated above:

1. **“High” projection.** This projection is based on an average of the timber volume sold within the highest three years during the period between 1993 and 1997. Timber volumes sold that are included in the projection are from 1993, 1996 and 1997. These are believed to reflect relative stability of direction for the reasons state above.
2. **“Moderate” projection.** This projection is based on the average volume sold during all five years between 1993 and 1997. It reflects ups and downs in both direction and markets that might occur. This projection reflects less management certainty than under the “High” projection.

High Projection:

Region	Average MMBF Sold '93, '96, '97	Average Annual Acres Based on TSPIRS Volume	Average Annual Acres Based on LRMP EIS Vol.
1	22.5	2,647	2,083
2	4.5	646	485
3	0.1	24	14
4	16.5	2,015	1,836
5	9.5	1,223	757
6	25.5	5,005	1,823
8	4.4	825	663
9	9.3	1,305	1,236
10	69.9	1,778	2,240
Total	162.2	15,468	11,136

Under the “High” projection approximately 162 MMBF of volume would be harvested each year from 11,100 to 15,500 acres. An estimated total of 1.62 Billion Board Feet would be harvested between 2005 and 2014 and for each succeeding ten year period. During this and succeeding ten year periods, timber harvest would occur on between 111,000 and 155,000 acres within inventoried roadless areas. This amounts to between .32% and .45% of inventoried roadless areas where existing forest plans would allow timber harvest to occur.

Moderate Projection:

Region	Average MMBF Sold '93-'97	Average Annual Acres Based on TSPIRS Volume	Average annual acres harvested from sold 93, 96, 97
1	19.0	2,236	1,760
2	6.0	863	647
3	0.2	46	27
4	15.6	1,898	1,730
5	8.0	1,023	633
6	18.4	3,607	1,314
8	4.4	829	666
9	8.7	1,228	1,162
10	49.7	1,264	1,592
Total	129.9	12,994	9,531

Under the “Moderate” projection approximately 130 MMBF of volume would be harvested each year from 9,500 to 13,000 acres. An estimated total of 1.3 Billion Board Feet would be harvested between 2005 and 2014, and an equal amount would be harvested during each succeeding ten year period. During each ten year period, timber harvest would occur on between 95,000 and 130,000 acres within inventoried roadless areas. This amounts to between .27% and .37% of inventoried roadless areas where existing forest plans would allow timber harvest to occur.

Alternative 2

This alternative would prohibit road construction and reconstruction within inventoried roadless areas, and portions national forests containing uninventoried roadless areas nationwide. Both stewardship and commodity purpose timber harvest would occur in close proximity to existing roads.

For analysis purposes the following assumptions are made:

1. Entry into roadless areas will continue to be difficult and controversial. Volume produced and acres harvested will continue to be affected by controversy.
 - a. None-the-less, it is assumed that direction will remain stable upon completion of the Roadless Area Conservation Rule, and that additional major changes in timber harvest levels within roadless areas will not occur as a result of future policy decisions.
 - b. The amount of timber harvest that will occur within roadless areas between 2005 and 2014, and for succeeding decades through 2040 is

likely to be less than the estimated offer for the period between 2000 and 2004 based on actual sold volumes during the period 1993 to 1997. However, it is likely that there would be a similar proportion of timber that might be offered in inventoried roadless areas without new roads or road construction. Based upon information provided in response to the May 18, 2000 request, about 27.2% of the volume sold from within roadless areas between 1993 and 1997 is estimated to be attainable between 2005 and 2014 and succeeding ten year periods through 2040 while complying with the prohibitions on road construction and road reconstruction. This amount is likely to be attainable in future years as well, given the number of inventoried roadless acres that have already been roaded, and the number of acres that lie within one half to one mile of an existing road.

2. The upper limit of entries into inventoried roadless areas without road construction or reconstruction is assumed to be similar to about 27.2% of the volume sold in Fiscal Years '93, '96, and '97.
3. Acreage estimates will be based on the spread of volume estimates developed based on TSPIRS reported accomplishments (Williams, no date) and an analysis of the roadless evaluation appendices within a sample of approved forest plans (Townesley, 08/25/00).
4. Harvest is assumed to continue into the future beyond 2040. If necessary, the average annual projection of volume could extend into the future. There is little risk of exceeding the theoretical sustained yield capacity given the relatively low volume being harvested compared to either the inventory of volume within roadless areas, or the potential for growth within these areas.

Two projections are made:

1. "High" projection. This projection is based on 27.2% of the average volume sold for fiscal years '93, '96, and '97..
2. "Moderate" projection. This projection is based on the 27.2% of the average volume sold during all years between fiscal years '93 and '97.

High Projection:

Region	Average MMBF Sold '93, '96, '97	Based on TSPIRS Vol/A	Based on LRMP EIS Vol/A
1	6.1	720	567
2	1.2	176	132
3	0.0	7	4
4	4.5	548	499
5	2.6	333	206
6	6.9	1,361	496
8	1.2	224	180
9	2.5	355	336
10	19.0	484	609
Total	44.1	4,207	3,029

Under the “High” projection approximately 44 MMBF of volume would be harvested each year from between 3,029 and 4,207 acres. An estimated total of .44 Billion Board Feet would be harvested between 2005 and 2014, and for each succeeding ten year period thereafter through 2040. During each ten year period, timber harvest would occur on between 30,000 and 42,000 acres within inventoried roadless areas. This amounts to between .09% and .12% of inventoried roadless areas where existing forest plans would allow timber harvest to occur.

Moderate Projection:

Region	Average MMBF Sold '93- '97	Average Annual Acres Based on TSPIRS Vol/A	Average Annual Acres Based on LRMP EIS Vol/A
1	5	608	479
2	2	235	176
3	0	13	7
4	4	516	470
5	2	278	172
6	5	981	357
8	1	226	181
9	2	334	316
10	14	344	433
Total	35	3,534	2,592

Under the “Moderate” projection approximately 35 MMBF of volume would be harvested each year from between 2,600 and 3,500 acres. An estimated total of .35 Billion Board Feet would be harvested between 2005 and 2014, and for each ten year period thereafter. During each ten year period, timber harvest would occur on between 25,900 and 35,300 acres within inventoried roadless areas. This amounts to between .08% and .10% of inventoried roadless areas where existing forest plans would allow timber harvest to occur.

Alternative 3

This alternative would prohibit road construction and reconstruction within inventoried roadless areas, and portions national forests containing uninventoried roadless areas nationwide. Only stewardship purpose timber harvest would occur in close proximity to existing roads.

For analysis purposes the following assumptions are made:

5. Entry into roadless areas will continue to be difficult and controversial. Volume produced and acres harvested will continue to be affected by controversy.
 - a. None-the-less, it is assumed that direction will remain stable upon completion of the Roadless Area Conservation Rule, and that additional major changes in timber harvest levels within roadless areas will not occur as a result of future policy decisions.
 - b. The amount of timber harvest that would occur within roadless areas between 2005 and 2014, and in succeeding decades through 2404 would likely be less than the estimated offer for the period between 2000 and 2004 based on actual sold volumes during the period 1993 to 1997.

However, it is likely that there would be a similar proportion of timber that might be offered in inventoried roadless areas using stewardship type sales without new roads or road construction. Based upon information provided in response to the May 18, 2000 request, about 9.1% of the volume sold from within roadless areas between 1993 and 1997 is estimated to be attainable between 2005 and 2014, and for succeeding ten year periods through 2040 while employing only stewardship purpose timber sales and while complying with the prohibitions on road construction and road reconstruction. This amount is likely to be attainable in future years as well, given the number of inventoried roadless acres that have already been roaded, and the number of acres that lie within one half to one mile of an existing road.

6. The upper limit of entries into inventoried roadless areas without road construction or reconstruction using only stewardship purpose timber sales is assumed to be similar to about 9.1% of the volume sold in Fiscal Years '93, '96, and '97 nationwide.
7. Acreage estimates are based on the spread of volume estimates developed based on TSPIRS reported accomplishments (Williams, no date) and an analysis of the roadless evaluation appendices within a sample of approved forest plans (Townsley, 08/25/00).
8. Harvest is assumed to continue into the future through 2040. There is little risk of exceeding the theoretical sustained yield capacity given the relatively low volume being harvested compared to either the inventory of volume within roadless areas, or the potential for growth within these areas.

Two projections are made:

3. "High" projection. This projection is based on 9.1% of the average volume sold for fiscal years '93, '96, and '97..
4. "Moderate" projection. This projection is based on the 9.1% of the average volume sold during all years between fiscal years '93 and '97.

High Projection:

Region	Average MMBF Sold '93, '96, '97	Average Annual Acres Based on TSPIRS Vol/A	Average Annual Acres Based on LRMP EIS Vol/A
1	2.0	241	190
2	0.4	59	44
3	0.0	2	1
4	1.5	183	167
5	0.9	111	69
6	2.3	455	166
8	0.4	75	60
9	0.8	119	112
10	6.4	162	204
Total	14.8	1,408	1,013

Under the “High” projection approximately 15 MMBF of volume would be harvested each year from between 1,408 and 1,013 acres. An estimated total of .15 Billion Board Feet would be harvested between 2005 and 2014, and for each succeeding ten year period. During each ten year period, timber harvest would occur on between 10,000 and 14,000 acres within inventoried roadless areas. This amounts to between .03% and .04% of inventoried roadless areas where existing forest plans would allow timber harvest to occur.

Moderate Projection:

Region	Average MMBF Sold '93-'97	Based on TSPIRS Vol/A	Based on LRMP EIS Vol/A
1	1.7	204	160
2	0.5	79	59
3	0.0	4	2
4	1.4	173	157
5	0.7	93	58
6	1.7	328	120
8	0.4	75	61
9	0.8	112	106
10	4.5	115	145
Total	11.8	1,182	867

Under the “Moderate” projection approximately 12 MMBF of volume would be harvested each year from between 900 and 1,200 acres. An estimated total of .12 Billion Board Feet would be harvested between 2005 and 2014, and for each succeeding decade. During each ten year period, timber harvest would occur on between 9,000 and 12,000 acres within inventoried roadless areas. This amounts to about .03% of inventoried roadless areas where existing forest plans would allow timber harvest to occur.